THE GRAPHICAL NFDRS PRODUCT

From Southern Area Predictive Services
February 1, 2012

INTRODUCTION

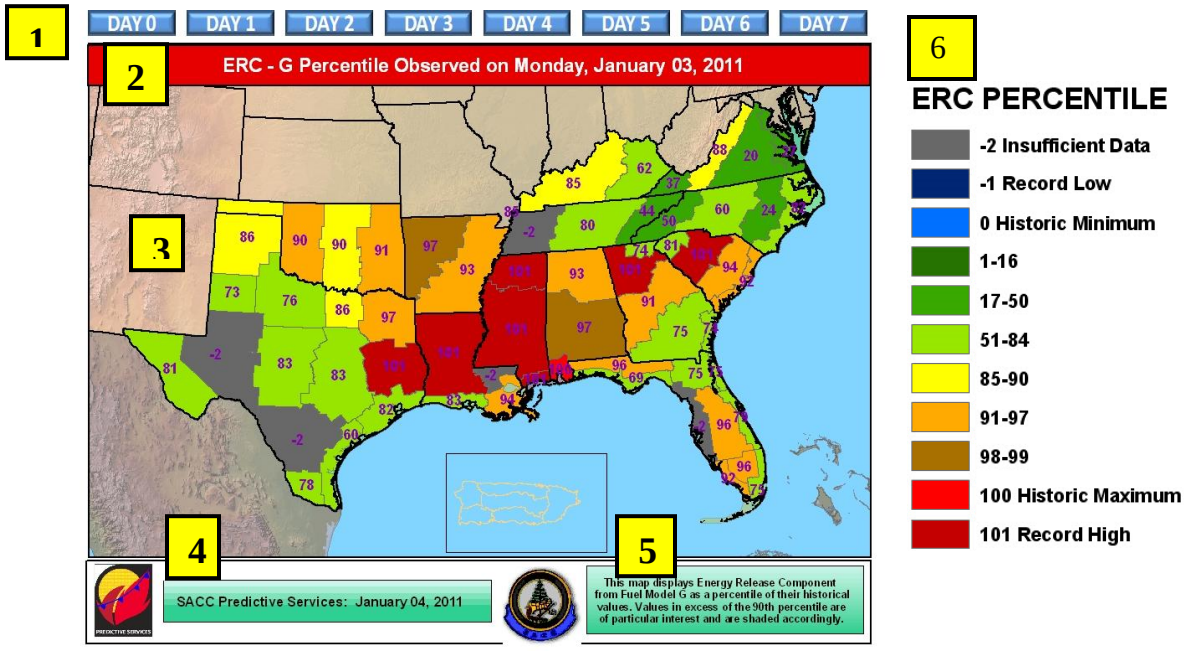
The Graphical NFDRS product is meant to be an additional tool to help fire managers at regional and local levels to be aware of regional fire danger conditions. ***This product does not replace the daily and seasonal management of the NFDRS model in WIMS of individual stations by station owners.***

The product is available from the fuels and fire danger section of the SACC web page: http://gacc.nifc.gov/sacc/predictive/fuels_fire_danger/fuels_fire-danger.htm
However, it is certainly possible to bookmark the opening page by using the hyperlink: http://gacc.nifc.gov/sacc/predictive/fuels_fire_danger/nfdrs/htm/GraphicalNfdrsErcMap0.htm.

Our intention is to run this twice a week, generally on Monday and Thursday. More frequent updates are possible if the situation warrants and time allows.

Comments, questions or concerns about this product should be directed to the Predictive Services Unit at the Southern Area Coordination Center (SACC).

DESCRIPTION OF FEATURES



1. The blue buttons across the top are hyperlinked to the forecast map for each day. The DAY 0 map is the most recent *observed* data. NFDRS indices are computed for the observation closest to 1300. When we run the product in the late morning, DAY 0 will depict yesterday's observed values. The DAY 1 map will depict today's forecast value. The green text box in the lower left corner is the actual day the product was run on.

In the example above, January 4 was the day the product was run, so the most recent observed data is January 3. The DAY 1 map would be valid on January 4, the DAY 2 map would be valid on January 5, etc. NFDRS is always only as current as the previous day.

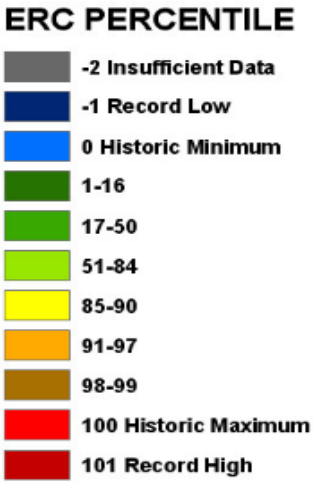
2. The Red Band across the top of each map provides the calendar day that the map is valid for.

3. Each PSA on the map is clickable and will take the user to a more detailed PSA specific page that will be described in detail below. The number displayed in purple in each PSA is the actual calculated percentile value of ERC-G based on that particular PSA's climatology for that day. The PSA is color coded in a standard color scheme that is intuitive to NFDRS. Blue and green colors are used to denote low fire danger, yellow and orange for moderate or increasing fire danger, and red for high fire danger.

4. The lower left green box is the actual day the product was produced. The actual run time for the production of charts and maps is about two hours with additional time needed for quality control and posting to the web.

5. The lower right green box is a brief two sentence description of the map.

6. The legend is placed on the html page to the right of the map. The colors are intuitive to NFDRS. A shade of charcoal gray is used when the PSA has less than 140 data points for a given month. This is equivalent to five years of data based on 28 days in the month. A more in depth treatment of this issue is associated with the sample data set illustrated below.



Record low ERC values will be less than the historic minimum available in the data set. We wanted these values to stand out, so they are assigned a value of minus one and are shaded dark blue. The procedure for determining which ERC values are below the historic minimum was updated on March 31, 2011 to treat each row individually.

Historic minimums will compute at the 0^{th} percentile by definition. These values were also assigned their own category and given a distinct blue coloration.

The dark green color is used from the 1^{st} percentile to the 16^{th} percentile. These values are more than one standard deviation below average. These values represent well below average fire danger.

VIEW ALL MAPS
(NO DRILL DOWN)

ABOUT THIS PRODUCT

The medium green color is used to indicate "low normal". They fall within the range of average, but are in the lower half of that range. This range indicates below average conditions.

The yellow-green color is used for the 51^{st}-84^{th} percentiles. These values are still within the range of average, but are in the upper half of the range. This color represents "high normal" and can be considered as above average fire danger, but not yet reaching moderate levels.

Moderate fire danger would fall in the yellow color range, from the 85^{th} – 90^{th} percentile.

The orange color is used for the 91^{st} – 97^{th} percentile. This range would indicate high fire danger.

The brown color for the 98^{th} - 99^{th} percentile indicates very high fire danger conditions.

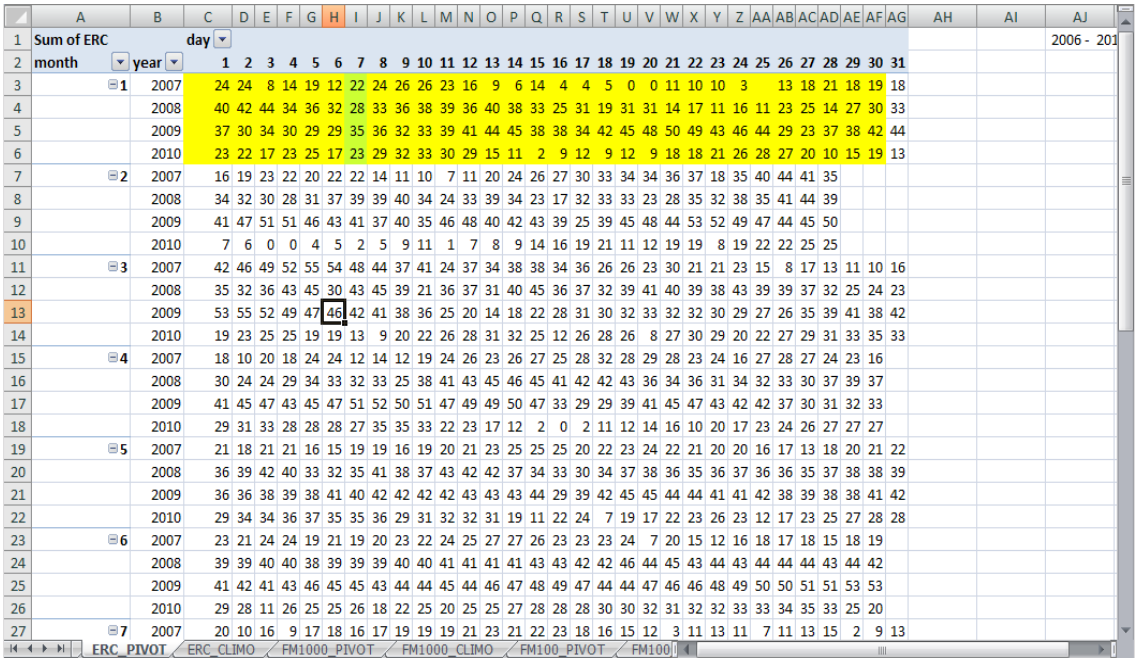
Historic maximums are denoted with a bright red color. The maximum of a data set will always be computed as the 100^{th} percentile by definition. These values are given their own color so that they stand out.

ERC-G values that exceed the historic maximum of the available data set are shaded with a darker shade of red for clarity and are assigned a value of 101 to indicate that they lie above the range of available data. Values of 100 and 101 indicate extreme fire danger. The procedure for determining the 101 indicator was updated March 31, 2011 to act on each row individually.

On July 8, 2011, we added a link to this "About" document and a hyperlink to a web page that contains a thumbnail of all of the maps. These thumbnail maps do not have the "drill down" capability that is described later in this document.

We set a threshold of five years so that the percentiles would be meaningful. When the data set only has five points or less per day, as in the example below, the computation of percentiles becomes less meaningful.

The data set illustrated below demonstrates how clustered the percentiles would be. On January 7, there are only four data points available in the climatology, and the total range of those ERC-G values is only 13. Clustering 100 percentiles within this narrow of a range renders the percentiles significantly less meaningful.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ
1	Sum of ERC		day																																2006 - 201
2	month	year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
3	1	2007	24	24	8	14	19	12	22	24	26	26	23	16	9	6	14	4	4	5	0	0	11	10	10	3		13	18	21	18	19	18			
4		2008	40	42	44	34	36	32	28	33	36	38	39	36	40	38	33	25	31	19	31	31	14	17	11	16	11	23	25	14	27	30	33			
5		2009	37	30	34	30	29	29	35	36	32	33	39	41	44	45	38	38	34	42	45	48	50	49	43	46	44	29	23	37	38	42	44			
6		2010	23	22	17	23	25	17	23	29	32	33	30	29	15	11	2	9	12	9	12	9	18	18	21	26	28	27	20	10	15	19	13			
7	2	2007	16	19	23	22	20	22	22	14	11	10	7	11	20	24	26	27	30	33	34	34	36	37	18	35	40	44	41	35						
8		2008	34	32	30	28	31	37	39	39	40	34	24	33	39	34	23	17	32	33	33	23	28	35	32	38	35	41	44	39						
9		2009	41	47	51	51	46	43	41	37	40	35	46	48	40	42	43	39	25	39	45	48	44	53	52	49	47	44	45	50						
10		2010	7	6	0	0	4	5	2	5	9	11	1	7	8	9	14	16	19	21	11	12	19	19	8	19	22	22	25	25						
11	3	2007	42	46	49	52	55	54	48	44	37	41	24	37	34	38	38	34	36	26	26	23	30	21	21	23	15	8	17	13	11	10	16			
12		2008	35	32	36	43	45	30	43	45	39	21	36	37	31	40	45	36	37	32	39	41	40	39	38	43	39	39	37	32	25	24	23			
13		2009	53	55	52	49	47	46	42	41	38	36	25	20	14	18	22	28	31	30	32	33	32	32	30	29	27	26	35	39	41	38	42			
14		2010	19	23	25	25	19	19	13	9	20	22	26	28	31	32	25	12	26	28	26	8	27	30	29	20	22	27	29	31	33	35	33			
15	4	2007	18	10	20	18	24	24	12	14	12	19	24	26	23	26	27	25	28	32	28	29	28	23	24	16	27	28	27	24	23	16				
16		2008	30	24	24	29	34	33	32	33	25	38	41	43	45	46	45	41	42	42	43	36	34	36	31	34	32	33	30	37	39	37				
17		2009	41	45	47	43	45	47	51	52	50	51	47	49	49	50	47	33	29	29	39	41	45	47	43	42	42	37	30	31	32	33				
18		2010	29	31	33	28	28	28	27	35	35	33	22	23	17	12	2	0	2	11	12	14	16	10	20	17	23	24	26	27	27	27				
19	5	2007	21	18	21	21	16	15	19	19	16	19	20	21	23	25	25	25	20	22	23	24	22	21	20	20	16	17	13	18	20	21	22			
20		2008	36	39	42	40	33	32	35	41	38	37	43	42	42	37	34	33	30	34	37	38	36	35	36	37	36	36	35	37	38	38	39			
21		2009	36	36	38	39	38	41	40	42	42	42	42	43	43	43	44	29	39	42	45	45	44	44	41	41	42	38	39	38	38	41	42			
22		2010	29	34	34	36	37	35	35	36	29	31	32	32	31	19	11	22	24	7	19	17	22	23	26	23	12	17	23	25	27	28	28			
23	6	2007	23	21	24	24	19	21	19	20	23	22	24	25	27	27	26	23	23	23	24	7	20	15	12	16	18	17	18	15	18	19				
24		2008	39	39	40	40	38	39	39	39	40	40	41	41	41	41	43	43	42	42	46	44	45	43	44	43	44	44	44	43	44	42				
25		2009	41	42	41	43	46	45	45	43	44	44	45	44	46	47	48	49	47	44	44	47	46	46	48	49	50	50	51	51	53	53				
26		2010	29	28	11	26	25	25	26	18	22	25	20	25	25	27	28	28	28	30	30	32	31	32	32	33	33	34	35	33	25	20				
27	7	2007	20	10	16	9	17	18	16	17	19	19	19	21	23	21	22	23	18	16	15	12	3	11	13	11	7	11	13	15	2	9	13			

ERC_PIVOT | ERC_CLIMO | FM1000_PIVOT | FM1000_CLIMO | FM100_PIVOT | FM100

In this case an ERC-G value of 30 represents the 76th percentile and is well within the range of average. However, an ERC-G value of 34 represents the 95th percentile. The increment between 30 and 34 is very small, but the percentile gap between the two is very large and each has a very different meaning. The wide range (in percentile) is due merely to the small sample size and may not actually represent the fire danger that is being experienced on the ground. It is likely that an ERC-G value of 34 is not that much different than an ERC-G value of 30 in terms of the actual fire danger. The gray color indicates low confidence in the data's ability to accurately represent the fire danger situation. These conditions are indicated on our maps by a value of minus two.

DATA and METHODOLOGY

Fire Family Plus Beta 4.1 (FFP4) software is used as our NFDRS processor. The database is updated with daily weather values drawn from WIMS in an FW9 format for approximately 285 stations across the Southern Area. These stations represent a wide spectrum of federal and state agencies.

The Graphical NFDRS utilizes daily values of Energy Release Component, 1000 hour fuel moisture, and 100 hour fuel moisture. The values are obtained from a batch process that computes the Daily Listing report which is available in FFP4. The report is run from January 1990 to present and is run for each of our 66 Predictive Service Areas (PSAs). This long data stream is used to develop climatologies of ERC-G, FM1000, and FM100 for each PSA.

Each PSA receives its own unique Daily Listing report, even though we occasionally had to choose stations lying outside the boundaries of the given PSA. These PSAs are represented by proxy stations that are considered "close enough" to the PSA to help represent it. When we

assembled our database for this product, we only considered GOES telemetered stations. We restricted ourselves to this view because:

1) We wanted a continuous stream of data to be available historically.
2) We wanted stations that provide current data on a day to day basis.

Every effort has been made to maximize the continuous historical data stream for each station. However, due to practical constraints of Fire Family Plus, the data was restricted to 1990 to present. Our experience with historical RAWS data shows that very few stations have a continuous data stream for the years prior to 1990. While there may be notable exceptions to this, the actual size of the database had to be considered due to the extended time it would take Fire Family Plus to process the additional data each time the product was run.

Green-up and freeze dates are estimated based on latitude, which could give rise to some minor differences between our calculated values and those output by WIMS. A site managed model will locally determine these dates and directly influence WIMS outputs from season to season. Fire Family Plus has no mechanism to apply different green-up and freeze dates from year to year.

Once FFP4 produces the output, we bring it into EXCEL and use pivot tables to determine the climatology for ERC, FM1000 and FM100. A daily climatology is computed for each PSA.

> For example: all ERC-G values for Jan 1 are averaged across the years available for Jan 1. The result is assigned to Jan 1 only, and is considered an average ERC-G value for that day.

We use a similar method to compute the maximum, the minimum, and the standard deviation. We also compute percentiles ranging from 1 to 100. These values are assembled for every day of the year.

Climatology is restricted to run from the beginning of available history (typically 1990 in the best case) to the end of the previous full year. This allows record high maximums and record low minimums to be displayed above (or below) the current maximums (or minimums) available in the historical record. If these values were averaged in, they could unduly influence the average value and the percentiles for that particular day. By restricting the climatology to the end of the previous full year, it will be easier to pick out when record setting conditions were occurring, not just when conditions were equal to the previous records.

From this compiled set of data, we extract the past twenty-four days for our short term graph. Our intention is to show ERC-G values for seven days in the future. Thus, our short term graph will cover only thirty-one days. However, we also offer a year long view of the data, where the user will be able to see how his values fit into a longer term view. The year long view begins by default on January 1, whereas the short term graph will automatically adjust forward with each subsequent run of the product. The short term graph will also "roll over" from December into January in a continuous stream.

The data for the charts and maps, including the FFP output; is available by PSA for download as an EXCEL spreadsheet (xls file). Each file is approximately 93KB in size. The user can download the file and see the various pieces used to construct the graphs.

Each file contains two tabs. One tab has the short term data and the other the year to date data. The following fields have been added to the data provided by Fire Family Plus: year, month number, month name, day, and mo_day. MO_DAY is an abbreviation for MONTH-DAY. The fields that are labeled ERC, BI, Wind, FM1000, FM100, Fm10, FM1, Temp, MnRH, RnDr, Rain, and KBDI are directly from Fire Family Plus and have not been altered.

We have also added a source field (either OBS or FCST) and fields for daily minimums, daily averages, daily maximums, and percentiles for 10, 16, 84 and 90. These latter fields are available for ERC, FM1000, and FM100. Fields of forecast values are also available for each of the three indices.

A new feature that we learned how to compute is a 90^{th} (or 10^{th}) percentile for the period corresponding to our short term graph, or 31 days. We designate this field as a flat90 or a flat10. These values are based all of the available data through the end of last year, but only consider the days that are included on the short term graph. We plot this value as a solid black line on our short term graphs.

Finally in the far right portion of the spreadsheet, we have fields that are labeled as dummy maximums. These fields are the maximums of the daily maximums rounded up to the nearest multiple of five with five added to it. ERC dummy maximums are assigned a value of 100 if the previous method exceeds 100. These values are used to create the red areas on the ERC graphs and the blue areas on the FM1000 and FM100 graphs.

The forecast data is derived from the National Digital Forecast Database (NDFD) available from the National Weather Service. These values are available on a grid point by grid point basis. We selected about 660 grid points (out of a possible 42,000) to represent all of our PSAs across the Southern Area. These 660 grid points are run through an NFDRS processor at the Missoula Fire Lab and ERC-G values are output. These values of ERC-G are averaged across the PSA with equal weight given to each point. This provides us with an average ERC-G value for each PSA for DAY 1 through DAY 7. These forecast values are appended to the bottom of the Fire Family Plus output for the purposes of graphing both on the same chart.

To the extent possible, we have used built in formulas in EXCEL to compute percent rank, percentile, average, standard deviation, daily maximums, and daily minimums. The over arching driver of the product is to have something that is *objectively driven and scientifically repeatable.* We believe that our "hands-off" approach accomplishes this in *a consistent and reliable fashion*. We are not computing ERC-G by some independent method. We are utilizing the output from Fire Family Plus to estimate and represent our fire danger condition. This is the very thing Fire Family Plus was designed to do and as such is universally accepted.

The best use of the forecast values is for short-term trends. The forecast is subject to model errors, especially five to seven days into the future. Users should not focus on a specific value,

but should be cognizant of the trend that is displayed. There will be times when the last observed value will be significantly different than the first forecast point. This is attributable to model output and potential modeling errors, not to our methodology for producing the graphs and maps.

KNOWN ISSUES

One specific modeling problem that we have noticed during the initial phases of this product is that a PSA can receive rainfall which is correctly depicted in the observed data as a significant reduction in the ERC-G value. However, the subsequent day's forecast is for significantly higher fire danger, because the model has not yet "caught up" to the fact that rain had actually fallen. This may result in a wide swing from DAY 0 to DAY 1 in the percentile represented. However, the model output is something that we have no control over. We do have plans to run some fundamental quality control checks to identify these situations.

A second issue that we have noticed is that the forecast ERC values do not take into consideration a snow covered condition. The only way to compensate for snow covered fuels is for the station owner to manually edit his observations in WIMS and to set the Wet Flag to "Y". This action will cause the NFDRS indices to drop to zero, which is correct for snow covered fuels. This will correctly portray the current and past values as unburnable. However, the forecast of ERC will still be too high. The forecast of ERC is very sensitive to relative humidity. Typically, Arctic air masses produce very low values of relative humidity and these low values translate into high values of ERC. These scenarios will produce a large jump from one day to the next which do not represent the actual conditions on the ground.

Energy Release Component was never designed to accurately represent a winter time snow covered condition. In the western US, when the area around a station becomes snow covered, the station is shut down. In the Southeast, where stations are up and operating all year long with no breaks, ERC will not be correctly represented in areas with prolonged snow cover. From 2001 to 2010, prolonged snow cover has not been an issue because those types of events did not occur. January 2011 did feature several snow events that resulted in snow covered fuels in excess of five or more days. We do plan to develop a routine, in combination with the scenario described above, to identify those times when the difference between days is too large and to color code these PSAs on our maps to indicate that there is a problem with the data.

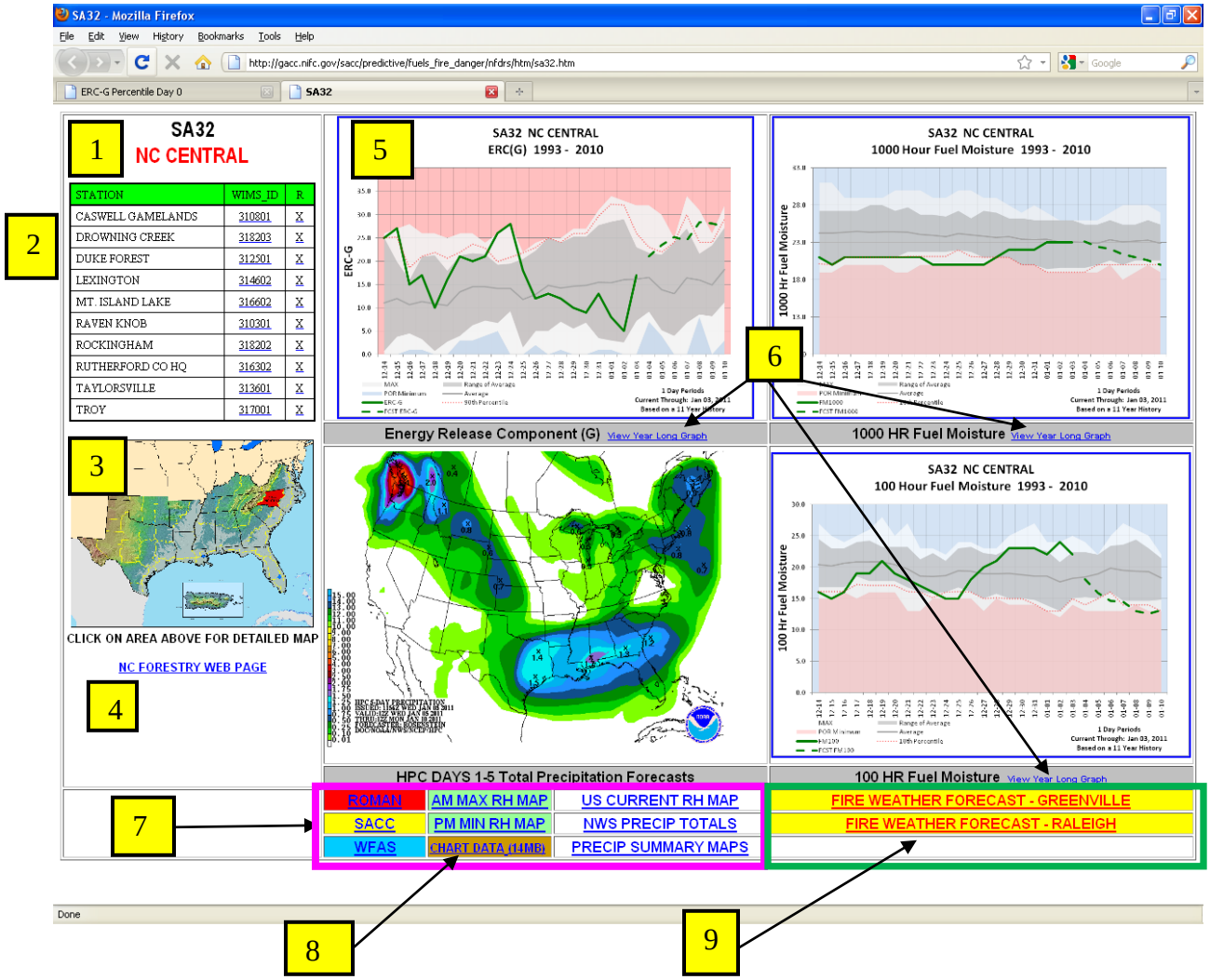
Another modeling issue that we have noticed is that the GFS model allows the ERC-G values to fall with rain events, but subsequently allows the values to rise sharply to values that are unreasonable given the rain that did occur. This occurs because ERC-G is highly dependent upon the duration of precipitation and the model is using an algorithm that computes the duration of precipitation based upon the amount of rain that actually fell, or that is forecast to fall. Thus, large rain events will translate to longer precipitation durations and small rain events will translate to shorter durations.

NFDRS is programmed so that precipitation durations greater than or equal to eight hours will effectively zero out the ERC-G value. After a rain event, the precipitation duration may be

forecast to be zero (a no rain condition) and the forecast model will cause ERC-G values to climb sharply in response to this value when in fact the true ERC-G value will be much lower.

This is especially true with late afternoon, evening, and overnight showers and thunderstorms. Late day or predawn rain events will keep fine fuels saturated for much of the night with near 100% RH recovery, water on or near the ground that does not evaporate, and heavy dew that adds moisture to the fuels. Even 100-hr fuel moisture values will respond positively to an event such as this that provides 12-14 hours of exposure to "wetting" conditions. In such cases the forecast values will be higher (or "hotter" or overly pessimistic) than experienced on the ground.

GRAPHS



The sample map above is the page that is displayed when a PSA is clicked from any one of the color coded ERC-G percentile maps. There are many useful features that this page provides and a discussion of each one follows.

The charts themselves were updated in January 2012 so that they could be created more quickly. The new routine requires 15-20 minutes to produce 366 charts. This is a significant improvement over the 50-60 minutes that were required for this when we initially launched this product. Furthermore, we found code online that helped us to convert a given graph series to a shaded polygon region below it. This not only provided more colors to us, but also allowed us to make the colors more vibrant. We also found code that allowed us to place the gridlines on top of the graph, rather than behind it. This makes the charts significantly easier to read. In late January 2012, we added the trace of last year's values to both the short term and year-to-date graphs. The trace of last year's values is provided merely as a reference point. The charts are initially exported as high resolution bitmap (bmp) files that are subsequently converted to png files via PowerPoint. Some of the features of our product include:

1. At the upper left corner is the PSA number that we use locally as well as the name that we have assigned to that PSA.

2. The table of RAWS stations in the upper left corner provides easy access to the stations that are used within the PSA to determine the fire danger. The table not only provides the station name, but also lists the station numbers used by WIMS for easy reference. The WIMS ID is hyperlinked to a page produced by WFAS for that station. The third column provides a direct link to the station's data in ROMAN. Please bring any discrepancies to the attention of a Predictive Service Member at SACC.

3. Directly below the table we have placed a thumbnail map of the PSA for easy reference. The thumbnail is hyperlinked to a more detailed map of the PSA that shows the locations of the RAWS that we are using to represent that particular PSA. The zoomed in view is designed to open in a new window. If you notice that the zoomed in view containing the RAWS stations does not match the table, please make a note of the PSA, and the RAWS that doesn't match, and notify a member of the Predictive Services Team at SACC.

4. In the area beneath the thumbnail map, we have some room to customize each page for that particular PSA. This area may contain links to state web sites or other sites that are relevant to users within that particular PSA. If there is a link that you want us to add to this area, please contact a member of Predictive Services at SACC.

5. The largest area of the page contains four graphics depicting the most recent trace of ERC-G, FM1000, and FM100 along with their respective seven day forecasts. The fourth graphic is the five day total precipitation forecast issued by the Hydrologic Prediction Center (HPC).

Furthermore, each of the three charts is hyperlinked to a larger version of the same chart. The HPC precipitation forecast map is hyperlinked to a page that displays the precipitation forecast maps for DAY 1, DAY 2, DAY 3, and DAYS 4-5 issued by HPC. These four maps are sized to fit on typical screens.

6. The link to the year to date graph is located directly beneath the chart.

On the graphs themselves:

The green solid line is the most recent and past data.
The green dashed line is the forecast values derived from the NDFD.
The gray line is the average computed for each day.
The gray region is the range of average, from the 16th to the 84th percentile.
The dotted red line is the 90th percentile value for ERC-G and the 10th percentile for FM1000 and FM100.
The red area represents the record maximum for ERC-G and the record minimum for the fuel moisture graphs. Red colors indicate high to extreme fire danger.
The blue area represents the record minimum for ERC-G and the record maximums for the fuel moisture graphs. Blue colors indicate low fire danger.
The chart title identifies the PSA by name and by number.
The chart title also provides the variable depicted.
The chart title also contains the span of years used for the climatology.
The X-Axis of the short term graph is labeled with each day.
The X-Axis subtitle gives the currency of the data.
The solid black line represents the 90th percentile for the entire 31 day period depicted on the ERC chart and the 10th percentile on the fuel moisture charts.

7. At the bottom of the page (highlighted in bright purple), we provide quick links to ROMAN, SACC, and WFAS. Links are also provided to our Maximum Relative Humidity Map, our Minimum Relative Humidity Map, to the NWS Precipitation Totals web page, and to a summary page of precipitation and drought related maps. The precipitation summary page displays the following maps:

- 14-Day, 30-Day, and 60-Day percent of normal precipitation,
- Stream Flows (USGS),
- Additional Precipitation Needed to normalize Palmer Drought Index map,
- US Drought Monitor,
- Southern Area Days Since Significant Rain (SACC),
- KBDI values (WFAS),
- Drought Outlook Map (CPC),
- Soil Moisture Anomaly (CPC),
- Short Term Blended Drought Percentile Map (CPC),
- 6-10 Day, 8-14 Day, 1 Month, and 3 Month Temperature and Precipitation Outlooks (CPC).

8. A link to the downloadable chart data is also provided in the bottom section.

9. Finally, a link to the Fire Weather Forecast that is responsible for that PSA is provided in the bottom section. (This section is highlighted in bright green in the above sample.) Clicking on this link will take the user to a new page. The new page will contain the Fire Weather Forecast from the designated office as well as a depiction of current radar, RH maps, soil moisture anomaly, and 30-DAY percent of normal precipitation. Each graphic on the page is hyperlinked to a subsequent larger version of the same item. There may be cases when this section will

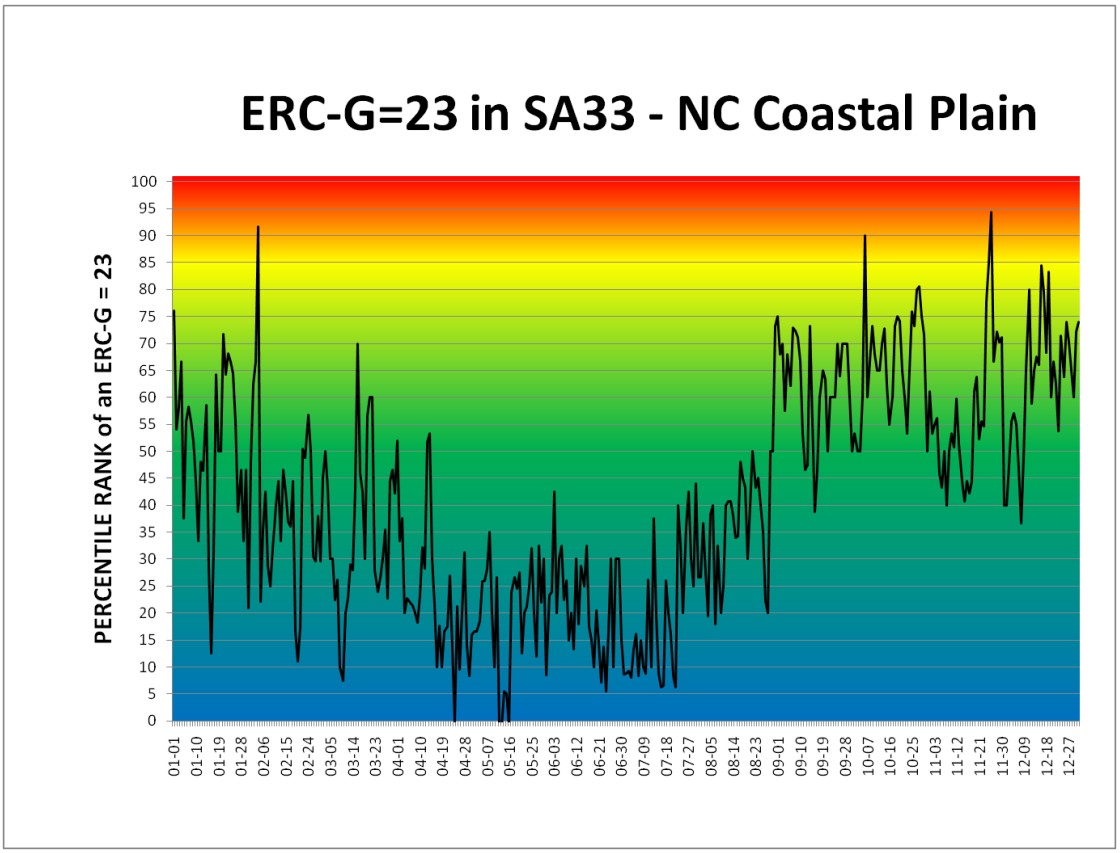
contain links to additional National Weather Service Fire Weather Forecasts. If you detect an omission, please make a note of the PSA and contact a member of Predictive Services at SACC.

CONCLUSION

While much of the above discussion is focused on ERC-G, the same process was used to determine the depictions of FM100 and FM1000.

Our graphs will differ from those produced by Fire Family Plus. We have been able to show that the 90th percentile and the 10th percentile vary each day and we believe that it is important to show this. Fire Family Plus allows the user to set up the working set and computes a single value for the 90th percentile across the period of interest. Thus, Fire Family Plus will show a flat line for the 90th percentile when in fact it varies.

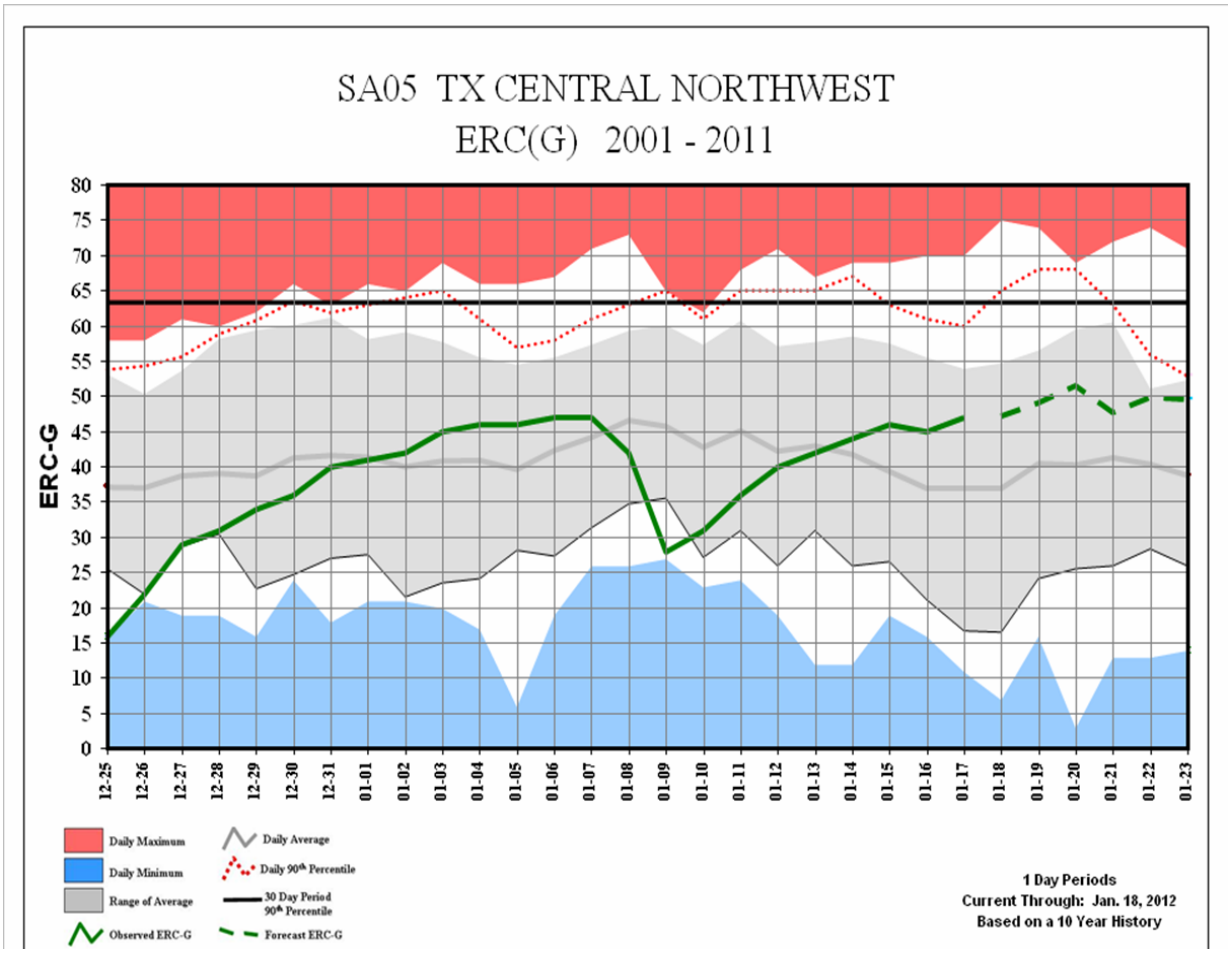
The graph below shows that a given value of ERC-G can have significantly different meanings at different times of the year. This difference is readily apparent when it is taken in the context of percentile. In the spring and summer, an ERC-G value of 23 falls well within the blue area and is of little concern. However, in the cold season, an ERC-G value of 23 could signify conditions falling in a 90-95th percentile range. The graph below illustrates the importance of considering more than just the value of a given parameter. Considering the value in the context of its climatology provides a critical piece of additional information to regional and local fire managers. Using percentile, rather than the actual value, can prove to be a helpful tool for decision making on daily and seasonal time frames.



The short term graph that we produce makes it very easy to pick out individual days with clarity. We believe that this is a distinct advantage over the Fire Family Plus charts that feature closely spaced tick marks with very few date labels. Fire Family Plus charts do become clearer when the term of the graph is shortened, but even when the term was shortened to a period covering 27 days, there were only two labels provided on the X-Axis.

With the addition of a flat line 90th percentile to our graphs, there are a couple of concerns that the user needs to be aware of. First of all, if you are above the daily 90th percentile (red dotted line) but below the flat line 90th (black solid line), you might be led to believe that you do not have a fire problem and could actually encounter problems without being prepared for it. This is certainly a potentially dangerous situation. In the graph below, there is a significant difference between the daily 90th and the flat 90th in late December (55 vs. 63). This is the worst case situation.

A second situation to be aware of is when you are above the flat 90th (solid black line), but below the daily 90th (red dotted line). In this case, if you are basing your decisions on the daily 90th, you may not think you have a problem, but you might encounter a surprising situation beginning around the flat line 90th. The 90th percentile is provided to alert you to problematic conditions. It is not a guarantee that problems will occur.



NFDRS is a process that endeavors to model fuel conditions. No model is completely accurate all of the time. It is up to fire managers to align what they actually experience in the field to the model output. It is our hope that this product will prove helpful in that regard and hopefully provides some forecast trends that enable fire managers to better anticipate the conditions that they encounter.

In the future, we hope to be able to do some analyses to help determine correlations and threshold values for each PSA. Fire Family Plus is a tool that we will extensively rely on and utilize for this effort. It will allow us to correlate fire occurrence data with various weather parameters and NFDRS indices to find or fine tune some "best-fit" scenarios.

We encourage everyone involved in managing fire, whether at the local park, refuge, forest, or other entity; to maintain their weather stations to NFDRS standards, to develop and implement Fire Management Plans, participate in Annual Operating Plans with your local NWS Office, maintain a Fire Family Plus database for local use, use the tools available in WIMS, and to stay abreast of day to day fire danger conditions in your area. It is our hope that this product will assist and inspire you toward this goal.

UPDATES TO THIS DOCUMENT

January 5-6, 2011. This document was initially developed at the request of the SAC-G.

January 21, 2011. Two paragraphs were added on page 7 to discuss snow covered fuels and to add an Update section beginning on page 12.

April 1, 2011. A statement regarding the procedure for determining the -1 and 101 indicators was added to the legend discussion on pages 2 and 3.

May 4, 2011. Minor grammar error was corrected on page 3 regarding percentiles that lie above the historic maximum.

July 9, 2011. A brief discussion was added regarding precipitation durations and ERC-G values rebounding to an overly pessimistic condition. A new legend was added with a brief statement regarding the link to this document and the link to a page with thumbnails of all seven maps.

January 18, 2012. We updated the entire document to reflect the changes in the charts and data.

February 1, 2012. Updated the document to discuss the trace of last year's values that we have added to the charts.